

HUMAN PERFORMANCE

Specialist's Factual Report

8/5/2020

I. ACCIDENT

Operator: Challenger Management L.L.C.
Aircraft: AgustaWestland AW139 (N32CC)
Location: Big Grand Cay, Bahamas
Date: July 4, 2019
Time: 0153 eastern daylight time (EDT)¹
NTSB #: ERA19FA210

II. SPECIALIST

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National Transportation Safety Board
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III. ACCIDENT OVERVIEW

On July 4, 2019, about 0153 eastern daylight time, an Agusta S.p.A. AW139, N32CC, owned and operated by Challenger Management LLC, impacted the Atlantic Ocean near Big Grand Cay, Abaco, Bahamas. The commercial pilot, airline transport rated co-pilot, and five passengers were fatally injured. The helicopter was substantially damaged. The helicopter was being operated under the provisions of title 14 *Code of Federal Regulations* Part 91 as a personal flight. Dark night visual meteorological conditions prevailed at the time and an instrument flight rules (IFR) flight plan was filed for a flight from Walker's Cay Airport (MYAW), Walker's Cay, Bahamas, to Fort Lauderdale/Hollywood International Airport (FLL), Fort Lauderdale, Florida. The flight originated about 0152 from a concrete pad located at Big Grand Cay, Abaco, Bahamas.

IV. DETAILS OF THE INVESTIGATION

This factual report contains information collected by the investigator throughout the field data collection phase of the investigation. Sources included company records, interviews, FAA documentation, and a simulator study.

¹ All times are reported in EDT unless otherwise noted.
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1.0 Flight Crew Training History

1.1 Flight crew pairing overview

From November 29, 2017, to February 22, 2019, the pilot in command (PIC) and second in command (SIC) conducted 14 flights together in the AW139. They flew the AW139 to Big Grand Cay island 10 of the 14 flights. Flight data recorder data indicated that 10 of the flights were conducted during the day and the environment for the remaining 4 flights could not be determined. During the 14 flights, the PIC was the pilot flying (PF) and SIC was the pilot monitoring (PM).

1.1.1 PIC's certifications and experience

From September 15, 1989, to October 2, 2006, the PIC received training for his private and commercial pilot certifications (airplane single engine land, multi-engine land, rotorcraft, and instrument helicopter). On April 19, 2007, he received a notice of proposed certificate action from the Federal Aviation Administration (FAA) for operating a Robinson R-44 helicopter in a temporary flight restriction (TFR) surrounding Fort Lauderdale, Florida on October 24, 2006².

The PIC's logbook was not located for review after the accident. However, his October 17, 2017 airman certificate application³ indicated he received combined night flying experience in rotorcraft and airplanes. He received approximately 42 hours of night instruction⁴, 123 hours of night takeoff/landing⁵, 157 hours of night flying as PIC⁶, and 103 hours of night takeoff/landing as PIC⁷.

1.1.2 PIC's AW139 initial type training

From August 28 to October 11, 2017 the PIC received training in the AW139. This included 60 hours of initial ground training at the Leonardo SpA Helicopters Training Academy Satellite Center in Whippany, New Jersey⁸; and flight training from Agusta Westland Training Academy⁹ instructors in Philadelphia, Pennsylvania. The PIC was trained in both PF and, PM roles, and was paired with the accident pilot. Flight training consisted of 8 hours visual flight rules (VFR), flight training conducted over 4 flights and, 6 hours IFR flight training conducted in VMC conditions over 3 flights for his type rating. Flight training addressed basic flight maneuvers (pre-flight, takeoffs, inflight, approaches, landings, malfunctions, emergencies), and various types of instrument procedures. During the flight training part of the course, the flight instructor administered two flight evaluations for the PIC. The first evaluation was flight maneuvers and the

² His private pilot certificate was suspended for 10 days on February 1, 2008.

³ AW139 type rating airman certificate application.

⁴ 39 hours in airplanes; 3 hours in rotorcraft.

⁵ 50 hours in airplanes; 73 hours in rotorcraft.

⁶ Night PIC: approximately 47 hours in airplanes; 110 hours in rotorcraft.

⁷ Night Takeoff and Landing PIC: 40 hours in airplanes; 63 hours in rotorcraft.

⁸ Conducted in accordance with FAA 14 CFR Part 142 Training Centers.

⁹ Flight training conducted by Agusta Westland instructors in the actual AW139 helicopter at Palm Beach International Airport (PBI).

second was instrument maneuvers. The PIC received a satisfactory rating for each maneuver. On some training flights, the flight instructor provided commentary on the PIC's performance via his initial type rating flight course syllabus. The following comments were from the instructor after the PIC completed his flights. The PIC received a below average on standard, medium, and steep turns on the first flight. The instructor noted the following: "Steep turns were off on entry with nose up pitch causing airspeed and altitude to deviate." On the third flight the instructor said "flying and FMS¹⁰ work is improving. Still slow with the FMS but gets there." On the fourth flight the instructor noted, "needs to continue to fly dual pilot to get more comfortable with using copilot to supplement pilot duties." During the second flight of the IFR portion of the course, the instructor provided comments to the PIC. The instructor noted, "systems knowledge is improving, IFR knowledge is also improving but a little weak." The PIC's syllabus indicated he received a passing score on the ground course final examination, and he passed the flight training course. He received his AW139 type rating on October 11, 2017. Overall evaluation of the PIC's performance indicated no additional training beyond the type rating program hours.

1.1.3 PIC's AW139 recurrent training

From November 12 to November 16, 2018, the PIC attended AW139 recurrent flight training at Augusta Westland Training Academy in Whippany, New Jersey. Recurrent training was conducted with the PIC as both PF and PM, and he was paired with the accident pilot. The PIC received 12 hours of ground training and 8 hours of training in the AW139 simulator. The 8 hours included 3.5 hours of flight time conducted under VFR and 4.5 hours of flight time conducted under IFR, which included night flying. The flight instructor noted the following on the check ride/proficiency check document: "progressive training/checking was halted and changed to traditional 61.58 training due to the applicant not reaching the required proficiency and failed more items than required." During the 2-hour portion of the recurrent training flight conducted under VFR, the PIC received three failures in his evaluation regarding maneuvers—engine control (EEC) failure (single and double), auto-rotations, and tail rotor malfunctions (left and right pedal stuck). He also received a below average rating for tail rotor drive shaft failure. His overall evaluation was below average. The instructor noted the following on the FAA recurrent sortie report: "The PIC was not trained in any major malfunctions due to receiving initial training in the aircraft. He needed to receive initial training for EEC and Tail Rotor (T/R)." During the two-hour portion of the flight conducted under IFR, the PIC received a below average rating under Airman's Skill-Decisiveness. Training records contained the following instructor comments: "Pilot lags behind using MCDU¹¹." The PIC's CFR Part 61 check ride included 3 hours of flight time in the AW139 simulator. This included a proficiency check in the following areas: pre-flight preparation, pre-flight procedures, takeoff and departure phase, inflight maneuvers, instrument procedures, landings and approaches to landings, normal and abnormal procedures, emergency procedures, and postflight procedures. According to the certificate of training, the PIC passed the proficiency check on November 16, 2018.

¹⁰ Flight Management System—An FMS is a specialized computer system that automates a wide variety of in-flight tasks, reducing the workload on the flight crew.

¹¹ MCDU—Multi Control Display Unit (MCDU)—allows pilot to input data into the flight management system for managing aspects of the flight such as waypoints.

1.2 SIC's certifications and experience

From November 12, 2004, to December 17, 2012, the SIC received his private, commercial, air transport pilot, and flight instructor certification with rotorcraft and instrument helicopter ratings.

The SIC's wife provided a written statement to NTSB investigators, and she indicated that the SIC accumulated more than 1,450 hours of night flying experience. From November 21-May 25, 2019 the SIC accumulated approximately 27 hours of night flying hours. It could not be determined how many of those hours were flown in aircraft type.

1.2.1 SIC's AW139 initial type training

From August 28 to October 12, 2017, the SIC received training in the AW139. This included 60 hours of initial ground training at the Leonardo SpA, Helicopters Training Academy Satellite Center in Whippany, New Jersey; and flight training from Agusta Westland Training Academy instructors in Philadelphia, Pennsylvania. The SIC was trained as previously described in section 1.1.2. The SIC's grade for each maneuver evaluated was average. Written remarks on the SIC's training file were made by the flight instructor and consisted of the following: On the second flight conducted under VFR, the instructor wrote that the [SIC] "struggled some with FMS entries, some CRM¹² issues as well, and wanting to fly single pilot, especially during emergency training." The SIC received a below average rating on resource management. The instructor wrote the following on his training file: "too much single pilot mentality caused him to get overwhelmed with weather, air traffic control, and flying." During the SIC's flight portion of the course conducted under IFR, the instructor stated the following: "great understanding of instrument procedures and FMS, but not always using checklist led to momentary loss of situation awareness during the flight." The SIC received his AW139 type rating on October 12, 2017. Overall evaluation of the SIC's performance indicated no additional training beyond the type rating program hours.

1.2.2 SIC's AW139 recurrent training

From November 12 to November 16, 2018 The SIC attended AW139 recurrent flight training by Augusta Westland Training Academy in Whippany, New Jersey. Recurrent training was conducted with the SIC as PF, PM, and was paired with the accident pilot. The SIC received 12 hours of ground training, 8 hours in the AW139 simulator, and he was deemed suitable for check ride and proficiency check. The 8 hours included 2.5 hours of flight time conducted under VFR, 4.5 hours of flight time conducted under IFR including night flying, and 1 hour of VFR/IFR flying. The flight instructor noted the following: "progressive training/checking was halted and changed to traditional 61.58 training due to the applicant not reaching the required proficiency and failed more items than required." The flight instructor's review of the SIC's performance during two hours of flight conducted under VFR indicated maneuvers was graded fail for electronic engine control failure (single and double), auto-rotations, tail rotor malfunctions (left and right

¹² Crew resource management-used primarily for improving aviation safety, CRM focuses on interpersonal communication, leadership, and decision making in the cockpit of an airliner.

pedal stuck), tail rotor drive shaft failure, and electrical system malfunctions. He also received a below average for CAT A takeoffs (various profiles) and use of the FD. Training records contained the following instructor comments: “The SIC was not trained, or he received substandard initial training for all the maneuvers that he failed. He is going to require additional training.” The SIC received 1 hour of additional training conducted under VFR, and his overall evaluation was average. The SIC’s Part 61 check ride included 3 hours of flight time in the AW139 simulator. This included a proficiency check in the following areas: pre-flight preparation, pre-flight procedures, takeoff and departure phase, inflight maneuvers, instrument procedures, landings and approaches to landings, normal and abnormal procedures, emergency procedures, and postflight procedures. The SIC passed the proficiency check.

1.2.3 PIC’s pre-accident activities

The PIC’s pre-accident activities were determined from interviews and cellphone records. A 72-hour history was provided by the girlfriend of the PIC. His normal routine was to wake up at 0800, eat, travel to the office, fly at 1000, and return to palm beach international (PBI). He would then play golf, nap for between 45-60 minutes, eat dinner, and would be in bed by 2200.

On July 1, he woke up at 0800, had a meeting, played golf, had dinner at 2000, and went to bed at his normal time. Cellular telephone activity¹³ began at 0753¹⁴ and ended at 2200. He had extended breaks¹⁵ between 0753 and 1322.

On July 2, he woke up at 0800, flew people to the island at 1100, played golf, and went to bed between 2200-2230. Cellular telephone activity began at 0812 and ended at 2126. He had extended breaks between 0812 and 1004; 1355 and 1514; 1527 and 1709.

On July 3, he woke up at 0800, prepared for his boss’s party, flew people to the island, had a nap, dinner at a restaurant, and was in bed at 2215. Cell phone activity began at 0721 and ended at 2359. He had extended breaks between 1427 and 1612; 1959 and 2324.

On July 4 he had a flight to the island. Cell phone activity began at 0000 and ended at 1914.

1.2.4 SIC’s pre-accident activities

The SIC’s pre-accident activities were determined from interviews and cellphone records. A 72-hour history was provided by the wife of the SIC. His normal routine was to wake up at 0600, activities for the day, and would be in bed by 2200. His wife said he would normally take a ‘traditional nap’ for 2-3 hours.

On July 1, he woke up between 0545 and 0600, flew 2.2 hours and landed at 0820. At 1100 he had a lesson with an instrument student and flew 2.3 hours. He left work at 1430 and

¹³ Calls outbound or inbound.

¹⁴ All times are local.

¹⁵ Extended breaks were considered: cellphone activity gaps greater than an hour.

arrived home between 1530 and 1545, napped, and ate. He was in bed before 2200. The SIC's cell phone activity began at 1009 and ended at 1535. He had extended breaks between 1130 to 1535. Text messaging began at 1246 and ended at 1249.

On July 2, he woke up between 0545 and 0600. He flew 2.4 hours and landed at 0830. He had a flight with students at 1030 and 1300, and finished work at 1500. He had a nap and was in bed before 2200. On July 2, a cell phone call was made at 1509. Text messaging started at 1039 and ended at 1603. He had extended breaks from 1047 and 1524.

On July 3, he woke up at approximately 0600 and flew for 2.7 hours and landed at 0850. At 1000 he was at his flight school with a student for 2.0 hours, and then left at 1300. He went home, ate, napped, and woke up at approximately 1800. Later that day he ate, watched television, and was in bed at approximately 2200. On July 3, cell phone activity began at 2347 and ended at 2358. Text messaging began at 0903 and ended at 1526. He had extended breaks between 0913 and 1322; 1322 to 1435.

2.0 Challenger Management LLC Overview

At the time of the accident, Challenger Management LLC operated the accident helicopter and 4 airplanes¹⁶, and employed 5 pilots at their facility in West Palm Beach, Florida. The PIC managed the helicopter operation.

In a post-accident interview, the chief pilot said crew schedules were normally 8-10 flying hours with a 12-hour day (total time), but this varied based on the needs of the chief executive officer (CEO). There was no established protocol for crew scheduling, and the chief pilot told pilots they should use 'common sense' when scheduling their flying time. He said that it was not uncommon to be contacted by the CEO at different times of the day and night, and that pilots were on-call waiting to receive phone calls or texts by the CEO. The company did not have a safety management system (SMS), nor were they required to. Communication about risks at the company was handled by the chief pilot. He required pilots to discuss with him any issues they had with fatigue, safety, or operating the aircraft and they did. However, the chief pilot could not recall any specific situations when pilots discussed with him safety, fatigue, or operations issues with the aircraft. Regarding pilot fatigue reporting, there was no system in place to report fatigue other than contacting the chief pilot and using 'common sense'. If a pilot was fatigued the chief pilot would tell them not to fly.

3.0 AW139 Simulator Study Overview

The NTSB investigative team met a Leonardo Helicopters office at CAE in Whippany, New Jersey, on November 19, 2019. Following introductions, the investigator in charge provided an overview of the accident and the human performance investigator provided an overview of the activities planned during the visit. The human performance investigator and human performance participant conducted three interviews with two simulator instructors and a chief flight instructor.

¹⁶ ERJ 190, EMB 550, EMB 505, and a Cessna 208.
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The human performance investigator (in the role of test director/coordinator) provided a briefing to the team regarding the test objectives, test scenarios and team member roles/responsibilities. Edits were made to the test scenarios as needed and agreement amongst the team was obtained.

On November 20, the team arrived at the Leonardo Helicopters/CAE facility where the Leonardo chief flight instructor provided a briefing on the differences between Phase 7 and 4 of the AW139 simulator software. The team relocated to the simulator bays and received a safety briefing and AW139 simulator orientation.

Orientation consisted of reviewing flight deck displays/controls, flight controls and EGWS¹⁷ alerts. Following orientation, the test director ensured that required materials were available for the simulation study. Test duration lasted approximately 5 hours (with a 30-minute lunch break). Time was allotted for any discussions, additional runs of the test conditions and technical difficulties. The team debriefed the simulator test points and observations. On November 21 the team reconvened at CAE/Leonardo Helicopters facility to finalize the simulator test results.

Objective of the simulation study was to demonstrate the functionality and pilot use of the relevant features of the Primus Epic Automatic Flight Control System (AFCS) on the AW139 helicopter flight deck. Demonstration included 10 pilot-in-the loop scenarios that focused on the pilot's ability to utilize various flight modes in conjunction with manipulating cyclic, collective, and pedal flight controls. Scenarios also included observation of visual/aural crew alerts related to flight path management during takeoff phase of flight. Crew alert style, size, font, and location were observed alongside listening to aural crew alert tones when they were activated during test runs. Goal of the simulator study was to gather more information on pilot interaction using the AFCS/EFIS¹⁸ and observed visual/aural crew alerts.

The scope of the simulation study was pilot interaction with systems on the flight deck and the phase of flight was limited to takeoff. The software utilized for the simulator study was Phase 7. Phase 7 software provided compatibility for Phase 4 software. Previously discussed, the simulator study consisted of 10 scenarios that demonstrated functionality and pilot use of the Primus Epic Phase 7 AFCS software on the AW139 helicopter flight deck. Scenarios were simulated during takeoff phase of flight, night environment, and with the helicopter flying over water. Night conditions and the pilot flying the helicopter over water provided the best representation of the accident flight environment. All scenarios were recorded by video so that the simulation could be reviewed in the future. The CAE NETC team ensured that the simulator was configured like the accident helicopter prior to the simulator study. Each scenario consisted of a test condition, evaluation criteria, and outcomes. Maneuvers were performed by pilot use of cyclic, collective, pedal flight controls, and automation as required for the test.

Attachment: Attachment 1: Interview Summaries

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Human Performance Investigator

¹⁷ EGPWS: Enhanced Ground Proximity Warning System.

¹⁸ Electronic Flight Information System; AFCS-Auto Flight Control System
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